

Appl. No. 09/774,505
Amdt. dated 01/17/2006
Reply to the Final Office Action of 11/17/2005

Listing of Claims:

1. (Previously Presented) A method of delivering information to multiple networked devices, the method comprising the steps of:

receiving a first request for a first item of information from a first networked device, the first request requesting the first item of information to be delivered to the first networked device as an ordinary unicast packet;

receiving a second request for at least a part of the first item of information from a second networked device, the second request requesting the at least a part of the first item of information to be delivered to the second networked device as an ordinary unicast packet; and

forming a combined packet, in response to the first request from the first networked device and the second request from the second networked device, the combined packet comprising a reliable multicast packet including a packet header comprising a first network address used for the first networked device, a second network address used for the second networked device, and the combined packet further comprises a data payload that includes at least a part of the first item of information, for delivering the data payload to multiple networked devices, wherein the at least part of the first item of information included in the data payload being destined for reception by the first networked device in a first ordinary unicast packet, and further wherein the at least part of the first item of information included in the data payload being destined for reception by the second networked device in a second ordinary unicast packet.

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2. (Previously Presented) The method according to claim 1 further comprising the steps of:

in response to receiving the first request, forming a first packet including the first network address and a first data payload;

in response to receiving the second request, forming a second packet including the second network address, and a second data payload;

determining that the first packet and the second packet both include the data payload; and thereafter performing the step of forming a combined packet.

3. (Original) The method according to claim 2 wherein the step of determining that the first packet and the second packet both include the data payload comprises the sub-step of:

comparing a byte size of the first packet to a byte size of the second packet.

4. (Original) The method according to claim 2 wherein the step of determining that the first packet and the second packet both include the data payload comprises the substeps of:

computing a canonical checksum for the first packet;

computing a canonical checksum for the second packet; and

comparing the canonical checksum for the first packet to the canonical checksum for the second packet.

5. (Original) The method according to claim 2 wherein the step of determining that the first packet and the second packet both include the data payload comprises the sub-step of:

performing a byte-by-byte comparison of the data payload of the first packet to the data payload of the second packet.

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6. (Original) The method according to claim 2 wherein the step of determining that the first packet and the second packet both include the data payload comprises the sub-steps of:

- computing a canonical checksum for the first packet;
- computing a canonical checksum for the second packet;
- comparing the canonical checksum for the first packet and the canonical checksum for the second packet; and

- in the case that the canonical checksum for the first packet matches the canonical checksum for the second packet performing a byte-by-byte comparison of the data payload of the first packet and the data payload of the second packet.

7. (Original) The method according to claim 2 wherein the step of determining that the first packet and the second packet both include the data payload comprises the sub-step of reading at least a part of one of the first packet and the second packet from a packet queue.

8. (Original) The method according to claim 2 further comprising the steps of:

- determining a first next hop destination for the first networked device;
- determining a second next hop destination for the second networked device; and
- determining that the first next hop destination is the same as the second next hop destination, and thereafter performing the step of forming a combined packet.

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9. (Original) The method according to claim 2 wherein the step of determining that the first packet and the second packet both include the data payload comprises the sub-steps of:

- comparing a byte size of the first packet to a byte size of the second packet; and in the case that the byte size of the first packet matches the byte size of the second packet:
- computing a canonical checksum for the first packet;
- computing a canonical checksum for the second packet; and
- comparing the canonical checksum for the first packet and the canonical checksum for the second packet.

10. (Original) The method according to claim 9 wherein the step of determining that the first packet and the second packet both include the data payload comprises the sub-step of:

- in the case that the canonical checksum for the first packet matches the canonical checksum for the second packet, performing a byte-by-byte comparison of the data payload of the first packet and the data payload of the second packet.

11. (Original) The method according to claim 2 wherein the step of determining that the first packet and the second packet both include the data payload comprises the sub-steps of:

- comparing a byte size of the first packet to a byte size of the second packet; and
- in the case that the byte size of the first packet matches the byte size of the second packet, performing a byte-by-byte comparison of the data payload of the first packet and the data payload of the second packet.

12. (Original) The method according to claim 1 wherein the step of receiving a first request for a first item of information comprises a sub-step of:

- receiving a request for web content.

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13. (Original) The method according to claim 12 wherein the step of receiving a request for web content includes the sub-step of:

receiving an http request.

14. (Previously Presented) The method according to claim 1 wherein the step of forming a combined packet includes the sub-steps of:

adding to the combined packet a first reliable unicast header part associated with the first network address used for the first networked device; and

adding to the combined packet a second reliable unicast header part associated with the second network address used for the second networked device.

15. (Previously Presented) The method according to claim 14 wherein:

the sub-step of adding to the combined packet a first reliable unicast header part comprises the sub-step of adding to the combined packet a first TCP header information part associated with the first network address; and

the sub-step of adding to the combined packet a second reliable unicast header part comprises the sub-step of adding to the combined packet a second TCP header information part associated with the second network address.

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16. (Previously Presented) A method of relaying a packet in a network, the method comprising the steps of:

receiving a data content part of a first packet, the first packet comprising a reliable multicast packet;

receiving a first destination network address part of the first packet, wherein the first destination network address is used for a first networked device;

receiving a second destination network address part of the first packet, wherein the second destination network address is used for a second networked device;

receiving a first reliable unicast header part of the first packet that corresponds to the first destination network address; and

receiving a second reliable unicast header part of the first packet that corresponds to the second destination network address.

17. (Original) The method according to claim 16 wherein the step of receiving the first reliable unicast header part comprises the sub-step of:

receiving a first TCP header.

18. (Previously Presented) The method according to claim 16 further comprising the steps of:

determining a first next hop address based on the first destination network address; and determining a second next hop address based on the second destination network address.

19. (Original) The method according to claim 18 further comprising the steps of:

comparing the first next hop address to the second next hop address; and

in the case that the first next hop address is equal to the second next hop address, forwarding the first packet to the first next hop in a network.

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20. (Previously Presented) The method according to claim 18 further comprising the steps of:

- comparing the first next hop address to the first destination network address; and
- in the case that the first next hop address is equal to the first destination network address, composing a reliable unicast packet including the data content part of the first packet, the first destination network address part of the first packet, and the first reliable unicast header part of the first packet.

21. (Previously Presented) The method according to claim 18 further comprising the steps of:

- comparing the first next hop to the second next hop; and
- in the case that the first next hop is not equal to the second next hop,
 - forming a second packet including the data content part of the first packet, the first reliable unicast header part of the first packet, and first destination network address of the first packet;
 - sending the second packet to the first next hop;
 - forming a third packet including the data content part of the first packet, the second reliable unicast header part of the first packet, and the second network destination address of the first packet; and
 - sending the third packet to the second next hop.

22. (Previously Presented) The method according to claim 20 wherein the step of composing a reliable unicast packet comprises the sub-step of:

- forming a unicast TCP/IP packet including the data content part of the first packet, first destination network address part of the first packet, and information derived from the first reliable unicast header part of the first packet.

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23. (Original) A method of relaying a packet in a network, the method comprising the steps of:

receiving a packet that includes a data content part, a plurality of destination addresses, and a plurality of reliable unicast header parts corresponding to the plurality of destination addresses;

separating the plurality of destination addresses and the corresponding plurality of reliable unicast header parts into a set of groups each of which corresponds to a next hop address; and

composing a set of packets, each of which includes a group of at least one reliable unicast header part and corresponding at least one destination address, and each packet corresponding to a next hop address.

24. (Original) The method according to claim 23 wherein the step of composing the set of packets includes the sub-step of

composing one or more unicast packets.

25. (Original) The method according to claim 24 wherein the sub-step of composing one or more unicast packets comprises a sub-step of:

composing a TCP/IP packet.

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26. (Previously Presented) A network device comprising:

a comparator for comparing an item of information associated with a first destination network address with an item of information associated with a second destination network address;

a packet merger for combining the first destination network address, the second destination network address, and the item of information in a packet comprising a reliable multicast packet, the reliable multicast packet including a packet header comprising the first destination network address and the second destination network address, wherein the item of information is to be received at the first destination network address in a first ordinary unicast packet and at the second destination network address in a second ordinary unicast packet; and

a network interface for transmitting the packet.

27. (Original) A network device comprising:

a packet parser for receiving a packet and extracting data, and a plurality of destination addresses, a plurality of reliable unicast header parts corresponding respectively to the plurality of destination header addresses; and

an associater for determining next hop addresses based on the plurality of destination addresses, and associating together destination addresses, and reliable unicast header parts that correspond to a common next hop address.

28. (Original) The network device according to claim 27 further comprising:

a new packet composer for composing a packet including destination addresses, and reliable unicast header parts that correspond to the common next hop address.

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29. (Previously Presented) A computer readable medium containing programming instructions for distributing information over a network, the computer readable medium including programming instructions for:

receiving a first request for a first item of information from a first networked device, the first request requesting the first item of information to be delivered to the first networked device as an ordinary unicast packet;

receiving a second request for at least a part of the first item of information from a second networked device, the second request requesting the at least a part of the first item of information to be delivered to the second networked device as an ordinary unicast packet; and

forming a combined packet, in response to the first request from the first networked device and the second request from the second networked device, the combined packet comprising a reliable multicast packet including a packet header comprising a first network address used for the first networked device, a second network address used for the second networked device, and the combined packet further comprises a data payload that includes at least a part of the first item of information, for delivering the data payload to multiple networked devices, wherein the at least part of the first item of information included in the data payload being destined for reception by the first networked device in a first ordinary unicast packet, and further wherein the at least part of the first item of information included in the data payload being destined for reception by the second networked device in a second ordinary unicast packet.

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30. (Previously Presented) A computer readable medium containing programming instructions for relaying a packet in a network, the computer readable medium including programming instructions for:

- receiving a data content part of a first packet, the first packet comprising a reliable multicast packet;

- receiving a first destination network address part of the first packet, wherein the first destination network address is used for a first networked device;

- receiving a second destination network address part of the first packet, wherein the second destination network address is used for a second networked device;

- receiving a first reliable unicast header part of the first packet that corresponds to the first destination network address; and

- receiving a second reliable unicast header part of the first packet that corresponds to the second destination network address.

31. (Previously Presented) The computer readable medium according to claim 30 further comprising programming instructions for:

- determining a first next hop address based on the first network destination address; and

- determining a second next hop address based on the second network destination address;

- comparing the first next hop to the second next hop;

- in the case that the first next hop is not equal to the second next hop,

- forming a second packet including the data content part of the first packet, the first reliable unicast header part of the first packet, and first network destination address;

- forwarding the second packet to the first next hop address;

- forming a third packet including the data content part of the first packet, the second reliable unicast header part of the first packet, and the second network destination address; and

- forwarding the third packet to the second next hop address.

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32. (Original) A method in a network server for distributing information over a network, the method comprising the steps of:

- receiving a first request for a first item of information from a first networked device associated with a first TCP header information;

- receiving a second request for the first item of information from a second networked device associated with a second TCP header information;

- providing a combined packet including

- at least one address information corresponding to the first networked device and the second networked device,

- the first TCP header information and second TCP header information, and

- a data payload that includes at least a part of the first item of information being requested by the first networked device and by the second networked device; and

- sending the combined packet into the network.

33. (Original) The method of claim 32, wherein the combined packet comprises a reliable multicast packet.